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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,050	08/30/2001	Rand David Dannenberg	M00A226	8351

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EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 08/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/944,050	DANNENBERG, RAND DAVID	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-15 and 22-56* is/are pending in the application.

4a) Of the above claim(s) *7-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 7/20/05
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on **May 24, 2005** has been entered.

2. This Office Action is also in response to applicant's amendment filed on **May 24, 2005**, which has been entered into the file.

3. By this amendment, the applicant has amended claims 22, 33, 34, 36, and 39 and has newly added claims 53-56.

4. Claims 7-15 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention group and species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on June 5, 2003.

5. Claims 22-56 remain pending in this application.

6. The objections the claims 32-34, 36, and 39-53 set forth in the previous Office Action are withdrawn in response to the amendment.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 22-38, 39-43 and newly added claims 53-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Bond et al (PN. 5,834,103) in view of the patent issued to Hirai et al (PN. 6,115,180).

Bond et al teaches an *optical coating* and a *method* for making the same wherein a *coated article* (10, Figure 1) that is comprised of a *substrate* (12, Figure 1) and an *optical coating (14) on the substrate*, (please see Figure 1, and columns 2-4) is disclosed. The *optical coating* (14) further comprises a *first antireflective film* of a *first dielectric layer* (16), a *metallic layer* (18) over the first antireflective dielectric layer and a *second antireflective dielectric film* (26), over the metallic layer. With regard to claim 24, Bond et al teaches that the *metallic* layer is *silver*. The method steps concerning depositing these layers as claimed in claim 39 are met by the disclosure of this layer structure implicitly.

Bond et al teaches that the first and second antireflective dielectric layer could be made of dielectric material such as various kinds of *metal oxides*, (please see column 3, lines 16-55), but it does not teach explicitly that the dielectric layer is made by the *amorphous* titanium oxide with *additive* in an oxidization state as claimed. **Hirai et al** in the *same field of endeavor* teaches an optical *multilayered film coating* that is comprised of dielectric layers made of *amorphous titanium oxide with additive of silicon oxide*, (please see Figure 3 and column 7, line 25-40). Hirai et al teaches explicitly that with different percentage amount of silicon dioxide additive to the amorphous titanium dioxide, different refractive indices for the dielectric layer thin film can be achieved. One skilled in the art would recognize immediately that the refractive index of the thin film layer is a crucial factor for determining the optical characteristics (i.e. reflection, transmission and antireflection properties) of the thin film layer. These explicit teachings of the composite layer constitutions with different refractive indices as indicated in Figure 3 would benefit one skilled in the art to select the desired composite film as the dielectric layer to achieve the desired optical properties for the optical coating. Hirai et al further teaches that the silicon dioxide-titanium dioxide composite film has the advantage of no polarization dependency, which makes

the thin film layer polarization-independent. It would then have been obvious to one skilled in the art to apply the teachings of **Hirai** et al to use the *amorphous* titanium oxide with additive of silicon oxide as the dielectric layers for the benefit of using dielectric materials with controllable refractive index so that the optical properties (including transmission, reflection and antireflection properties) of the coated optical article can also be controlled and tailored with ease and also making the coated article being polarization independent.

With regard to claims 25-27, Bond et al further teaches to include a titanium layer (20) as a *barrier layer* that is interposed between the metallic layer and the second antireflective film. Although this reference does not teach explicitly to also place a barrier layer between the first dielectric layer and the metallic layer , however such modification would have been obvious to one skilled in the art for the benefit of protecting the metallic layer being oxidized in an oxygen environment, (please see column 3, lines 35-50).

With regard to claims 28-32, the cited references do not teach explicitly about the cited properties of the amorphous material are *substantially* the same at a heat-treatment temperature of the substrate, however such features are implicitly included, since Bond et al in combination with Hirai et al references teach a **final** product of the optical coating comprising the amorphous material with a set amorphism, refractive index, and size. The product-by-process limitations concerning the amorphous material at a temperature treatment temperature, (which is an arbitrary temperature) of the substrate, are given no patentable weight since the process, the temperature treatment of the substrate, does not distinguish the **final product** which is the optical coating comprising the amorphous material, from the optical coating of the instant application.

With regard to claims 33-34, 36 and 53-56, the features concerning the amorphous material is **sufficient** to reduce atmospheric oxidation of an underlying layer and/or **sufficient** to reduce contaminant migration to an overlying layer are considered to be implicitly met by the implicitly property of the same

amorphous materials disclosed by **Hirai** et al, otherwise the amorphous material will not be stable enough to be used as a layer material in a multilayer coating structure, which certainly include underlying and overlying layer.

With regard to claim 35, the feature concerning the amorphous material is **sufficient** to reduce haze, and with regard to claim 37, the feature concerning the crystallization temperature are implicitly met by the amorphous material of Hirai et al since they are **implicitly** properties of the amorphous material, (since the instant application and the cited Hirai et al reference both discloses the same amorphous material with the same additive, such inherent property should be implicitly met).

With regard claim 38, Hirai et al teaches explicitly that the amorphous titanium oxide with silicon oxide additive can have refractive index of 2.1, (please see Figure 3).

With regard to claims 40-42, Bond et al teaches that the layers are deposited by *sputtering* coat process and it is done in an oxygen environment, (please see column 3, lines 15-50). However it does not teach explicitly that it is a titanium is used as the target. **Hirai** et al teaches that the amorphous titanium oxide with silicon dioxide additive layer material in the multilayer structure is formed by sputtering process in *oxygen environment* with titanium oxide and the additive (i.e. silica) as the target, (please see column 7 lines 5-24). It would then have been obvious to one skilled in the art to apply the teachings of Hirai et al to modify the deposition method of Bond et al for the benefit of manufacturing the coated article using sputtering process with sufficient oxygen content to form the desired amorphous **oxide** layer. Although it does not teach that the titanium and the additive as separate target such modification would have been obvious to one skilled in the art for the benefit of having a control of the sputtering process for the two materials separately.

With regard to claim 43, Hirai et al teaches that the additive is silicon oxide, as explicitly discussed in paragraphs above.

9. Claims 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Bond et al and Hirai et al as applied to claim 39 above, and further in view of the patent issued to Lingle et al (PN. 6,514,620).

The *coated articles* and *method* for making the same taught by Bond et al in combination with the teachings of Hirai et al as described for claim 39 above have met all the limitations of the claims. These references however do not teach explicitly about subject the coated article to heat treatment as recited in claims 49-52.

Lingle et al in the came field of endeavor teaches a coated optical article having an optical coating formed on a substrate (1, Figure 1) wherein the optical coating is comprised of a metallic layer (7) interposed between two dielectric antireflective layers (3 and 11) wherein the coated article, including the substrate, is heat-treated with temperature (about 500 Celsius) which is implicitly above the heat treatment of the substrate (normally about 150-200 Celsius) alone, (please see column 7), in order to enhance the durability and the visible transmittance of the coated article, (please see column 6, lines 48-64). Lingle et al teaches that the heat treatment is done through the substrate in monolithic manner wherein this heat treatment may include tempering, bending and heat strengthening, (and the temperatures for these treatment are included), (please see column 7). It would then have been obvious to one skilled in the art to apply the teachings of Lingle et al to make the coated optical article undergo heat treatment for the benefit of making the coated article with enhanced heat-durability and enhanced visible transmittance. Although these references do not teach about the heat treatment temperature is below a crystallization temperature of the amorphous material such modification would have been within the general skill of a worker in the art for the purpose of making the amorphous material not to crystallize and therefore lose the amorphism.

10. Claims 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Bond and Hirai et al as applied to claim 39 above, and further in view of the article "Single-and dual-ion-beam sputter deposition of titanium oxide film" by Hsu et al (Applied Optics Vol. 37, No. 7 pages 1171-1176).

The method for coating an optical coating on a substrate taught by **Bond** et al in view of the teachings of **Hirai** et al as described for claim 39 above have met all the limitations of the claims. These references however do not teach explicitly that the amorphous titanium oxide is deposited at a low temperature and high deposition rate. **Hsu** et al in the same field of endeavor teaches a sputtering disposition process for forming titanium oxides film wherein Hsu et al teaches **explicitly** that when the titanium oxide deposited at *room temperature* (about 25^0 Celsius) the resultant film is always amorphous, (please see page 1171 and column 2, first paragraph). Hsu et al also teaches that sputtering rate of deposition is high. Although this reference does not teach explicitly that the rate is above 5 angstroms per second, however such rate is within common rage of deposition rate, (normally 1 angstroms to 20 angstroms per second). It would then have been obvious to one skilled in the art to apply the teachings of Hsu et al to deposit the amorphous titanium oxide layer at room temperature for the benefit of ensuring the amorphous phase of the titanium oxide film.

Response to Arguments

11. Applicant's arguments with respect to claims 22-56 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments with regard the cited Hartig et al (PN. 5,344,78) and Lingle (PN. 6, 514,620) references concerning the incompatibility of the oxygen environment are wrong since if the coating system of Hartig et al or Lingle are not compatible with oxide layers **neither** will be the instant

application since all of them using *silver layer* as the reflective metallic layer. If oxidization will occur to silver layer in the cited references then it will also happens to the instant application.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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